

Throughout the book, Grinspoon discusses the relevance of science to religion. Cosmic evolution, he says, "carries a message of complete and profound unity, which I think can be read as a reason to care deeply for all things, especially for the living Earth and its creatures, the most highly evolved local products of matter's slow climb from formlessness" (p. 86). Cosmic evolution, he suggests, is "the greatest story ever told," and indeed others before him have called it "Genesis for the 21st century." Grinspoon describes himself as raised as a "secular humanist Jewish American," now professing sympathies with Buddhism. On the subject of God he says, "Even scientific rationalists like Sagan and Clarke, considering the capabilities of long-lived intelligences, talked themselves into the likely existence of omnipotent, godlike creatures. Yet they recoil with horror from people who express a belief in the existence of such creatures but come at it from outside science." Both possibilities are speculative, of course, but one is natural, the result of eons of evolution by natural selection or manufactured artificial intelligence, while the other is supernatural. The distinction should not be lost.

The tone of *Lonely Planets* is unabashedly irreverent, as when Grinspoon calls Kepler a "philosopherfreak" (p. 10), discusses "our sorry-ass excuse for intelligence" (p. 402), or conjures up the image of a Dalai Lama who "has to sit on the can like the rest of us" (p. 356). Some will find this approach refreshing, others too flip or even offensive. But I believe all will find the book thought-provoking.

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Harmless Naturalism: The Limits of Science and the Nature of Philosophy

by Robert Almeder. Open Court, 1998. xii + 235 pp. \$52.95 (hardcover), \$24.95 (paper). ISBN 0-8126-9379-5, ISBN 0-8126-9380-9.

According to "scientism", the only legitimately answerable questions are those that scientists can answer on the basis of scientific inquiries, which are based upon the use of scientific methods. By implication, the only legitimate claims are those that can be confirmed or disconfirmed by the methods of natural science. The author of this book, which is subtitled *The Limits of Science and the Nature of Philosophy*, contends that arguments for scientism are mistaken and that it cannot be sustained. He supports his position with rigorous arguments most readers will find persuasive.

According to the introduction, landmarks in the emergence of scientism include Hume's distinction between thoughts about relations between ideas and matters of

fact, where the latter must be traceable to impressions in experience that gave rise to them and are otherwise illegitimate, and the logical positivist's distinction between analytic and synthetic sentences, where hypotheses about the world must be reducible to observation sentences, whose truth or falsity may be ascertained, under suitable conditions, by means of direct observation or simple measurement.

These positions render theological beliefs about the existence of God (under non-panthetic conceptions) and moral principles about right and wrong (under non-relativistic conceptions) beyond the scope of science and therefore illegitimate or meaningless. Neither the existence nor the non-existence of one or more gods can be ascertained by scientific inquiries. And, while scientific inquiries can establish which persons (families, religions, and cultures) hold which beliefs about right and wrong, for example, they offer no basis for resolving which, if any, happen to be true.

1. The Replacement Thesis

Scientism has received its most influential philosophical formulation in the work of W.V.O. Quine, who has championed "naturalized epistemology", especially in the form of *the replacement thesis* (that the only meaningful questions are those which can be answered by scientific inquiry). This position implies that epistemology as a normative enterprise devoted to establishing the conditions under which beliefs are justifiable (where scientific methods themselves require justification) no longer functions as traditionally conceived, but is replaced by science as its own monitor.

Almeder takes the views of other philosophers quite seriously, explaining and appraising arguments advanced by Barry Stroud, Ernest Sosa, and William Lycan, for example, against the replacement thesis and by Ron Giere, Patricia Churchland, and Paul Churchland in its support. He endorses the observation of Hilary Putnam that a cognitive theory of science which defined the conditions for rational beliefs on the basis of the cognitive capacities that produce them will be trivial or false, since beliefs that are produced by reliable cognitive processes are not always rational. This distinction raises some subtle questions to which we are going to return below.

Almeder also appreciates the observation of Harvey Siegel that the replacement thesis is plausible only if the methods of science are capable of attaining the aim of science, which presupposes standards of rationality and justification that are extra-scientific. Indeed, given alternative conceptions of "the method of science" (such as Inductivist, Deductivist, and Abductivist formulations) and a specification of the aim of science, such as that of discovering laws of nature, it becomes possible to evaluate them on the basis of their capacity to secure that objective (Fetzer, 1993, 2002). Some conceptions of scientific method are capable of attaining the aim of science.

Almeder defends Quine against the charge that naturalized epistemology cannot displace traditional epistemology because traditional epistemology is

"normative" while naturalized epistemology is not. He contends that science generates its own "norms" in attaining its ends. But the existence of quacks, charlatans, and frauds in science demonstrates that not all who call themselves "scientists" display the standards appropriate to science. Without knowing the practices that scientists ought to display, we cannot know whether or not displayed practices are proper.

Scientists, after all, are human beings who enjoy diverse activities in their lives, including such things as hunting and fishing, reading, and traveling. Without an appropriate conception of the nature of science with respect to its methods and its aims, it would be impossible to ascertain when science is being practiced and when it is not. Even mundane activities have distinct objectives and methods for their attainment, such as brushing your teeth to avoid cavities. Quacks, charlatans, and frauds might attain their ends by securing grants and earning tenure, but that, no more than brushing teeth, does not make quackery part of the practice of science.

2. The Transformational Thesis

Alternatively, advocates of the transformational thesis, such as Alvin Goldman, are willing to preserve the traditional function of epistemology but want to use science to ascertain what kinds of cognitive processes or information-processing procedures are the most efficient, effective, or reliable in producing true beliefs as the product (where, while some questions are meaningful even though they cannot be answered by scientific inquiry, whether anyone knows anything must be determined on the basis of scientific studies of the kinds of causal systems productive of knowledge).

The distinction between rational beliefs and beliefs produced by cognitive systems of specific kinds to which Putnam appeals might likewise matter. Let us presume that beliefs are rational when they are well-supported by the available relevant evidence and irrational when they are not. The very concept of relevant evidence concerns logical relations, where physical findings and witness reports qualify as evidence that is relevant to a hypothesis when their presence or absence or truth or falsity makes a difference to the truth or falsity of that very hypothesis.

Making a difference, I take it, means increasing or decreasing the likelihood of a hypothesis, given that evidence, where the likelihood of a hypothesis is equal to the probability of that evidence, given that hypothesis. Presumably, a cognitive system will be an efficient, effective, or reliable system just in case (implicitly or explicitly) it implements the principles that define rational belief acquisition on the basis of suitable relations between hypotheses, evidence, probabilities, and likelihoods. A reliable cognitive system instantiates processes that are logically justifiable. Indeed, how could a cognitive system otherwise qualify as "reliable"?

The traditional conception of knowledge defines "knowledge" as warranted (or justified) true belief in contrast to mere opinion or lucky guesses. But famous

counterexamples presented by Edmund Gettier, for example, establish that a person could be in a state of true belief based on a set of circumstances where the justification was somehow inappropriate. Suppose Jones has a new Buick, which is in the shop for repairs. If Smith saw him driving a loaner, which also happened to be a Buick, he might justifiably infer that Jones has a new Buick, yet there would be room to deny the justification was adequate to the belief.

Almeder draws upon arguments from Carl Ginet, Laurence Bonjour, Marshall Swain, and others in his analysis of Gettier-style counterexamples. He offers an extensive discussion of the arguments of Alvin Goldman for a reliabilist theory of justification compared with Fred Dretske's for a reliabilist theory of knowledge.

Almeder offers a thorough investigation of multiple facets of these questions. But in this context for this audience, it may be useful to consider an ontological issue that underlies the very specific and quite detailed discussion his book provides, namely, the distinction between empirical frequencies and causal propensities.

3. Reliability and Rationality

Suppose we were considering a very broad range of methods for the purpose of information processing or decision making, including coin tossing, crystal-ball gazing, tea-leaf reading, and scientific method (in one or another of its guises). If we wanted to appraise their reliability as sources of truth, then we might try conducting series of tests to ascertain the relative frequency with which each of these methods produces true outcomes (by asking questions answerable as true or false, taking "heads" to mean true and "tails" to mean false, for example). We could then study the truth frequency with which each of them attained success.

However, even coin tossing, even over long runs of trials, were to attain a high truth frequency, we would presumably be disinclined to suppose that tossing coins is a reliable truth-producing process. The reason is that reliability is not merely a truth frequency across sets of trials but a propensity of causal systems to produce truths from trial to trial, where the strength of that propensity can be displayed by the truth frequencies it produces when subjected to trials, just as the reliability of your car to start is not simply the frequency with which it has started in the past but rather the strength of its tendency to start on any trial.

The reliability of a cognitive system to produce truth should be understood as a propensity of that system to produce truths, but with a certain qualification. While it is tempting to suppose that systems with higher truth frequencies are therefore more reliable than systems with lower truth frequencies, that is not invariably the case: a system might display a high truth frequency by chance. What we need to know is whether that higher truth frequency would be true across different histories of the world rather than during only this specific one. The inference from the frequency to the propensity itself requires justification.

If coin tossing were to attain a higher truth frequency than scientific method, for example, then it would be tempting to infer coin tossing is more reliable than scientific method. We might resist drawing such a conclusion, however, in the absence of an explanation for the difference, especially in the form of a causal mechanism to account for it. The existence of such a causal mechanism would explain why the difference between processes does not merely result from another form of "lucky guessing". It would provide a justification—an epistemic warrant—for preferring the outcomes of one process to those of some other. It would enable us to know such a difference is not merely a matter of chance.

If these considerations—which appear to be crucial to these issues and would have benefited from explicit discussion—are well-founded, then they shed light on the centrality of the concepts of reliability and of rationality. They suggest that cognitive systems are reliable when they instantiate appropriate principles of rationality, especially those of inductive and of deductive logic. The justification for preferring one cognitive system to another thus depends on demonstrating that the principles of reasoning incorporated by one such system are preferable to those incorporated by another, which is a function of traditional epistemology.

4. Harmless Naturalism

Almeder acknowledges a third form of naturalized epistemology, which claims that the natural sciences fulfill a *privileged* function as the only way to provide knowledge that is public about the contents of the world, including the laws that govern it, even though there are forms of knowledge that are private and cannot be vindicated or validated by the methods of natural science. And he maintains that philosophers as diverse as Charles Peirce, William James, Ernest Nagel, Rudolf Carnap, Carl Hempel, and Nicholas Rescher represent very similar points of view, even though they differ relative to their various conceptions of scientific method.

According to harmless naturalism, the epistemic justification for beliefs about the world is a function of whether that belief deductively implies observational data, the occurrence of which tends to confirm or to disconfirm that belief. What makes harmless naturalism a more defensible position than Humean empiricism or logical positivism, presumably, is that it does not restrict the language of science to terms that are reducible to observables and encompasses hypotheses that are inductively as well as deductively supportable on the basis of the contents of experience. But a deeper issue lies just beneath the surface concerning the nature of natural laws.

Almeder concedes that his conception depends upon some form of hypothetico-deductivism for its comprehensive defense, but the problems are ontological and not merely epistemological. On a Humean conception of laws as special kinds of correlations—where necessary connections as nomological relations are excluded as illegitimate conceptions on epistemological grounds—there will always remain a logical crevasse between the future and the past. That

is why no matter how regularly a correlation has obtained in the past, there is no guarantee that it will continue to hold in the future, precisely because there are no non-logical kinds of necessity—causal or non-causal—that ontologically relate the future to the past.

Hume, I believe, threw the ontic baby out with the epistemic bath water. Once we recognize that concepts can be meaningful even though they are not definable by means of observables, so long as they remain empirically testable, it becomes possible to adopt a more adequate ontology. As Karl R. Popper emphasized, only a non-Humean conception of natural necessity enables this chasm to be bridged, where laws are understood as having the force of prohibitions and can be tested only by attempting to violate them. While derivations from higher-level laws can justify inference to another law, only unsuccessful attempts to falsify a law properly count as empirical evidence that can support the existence of that law.

Almeder discusses whether or not laws must be confirmable on the basis of positive instances, with brief discussions of the views of Nelson Goodman, Clark Glymour, and Paul Horwich, among others. Regardless of their merits, however, an adequate theory of scientific knowledge presupposes an adequate ontology, especially a conception of laws that transcends correlations and embraces one or more kinds of natural necessity. It requires an ontology of propensities and frequencies and a conception of laws that encompasses causal and non-causal forms of natural necessity, including, I should add, of probabilistic causation.

5. Traditional Epistemology

Almeder demonstrates that naturalized epistemology in the guise of either the replacement thesis or the transformation thesis is not defensible and that there are legitimate normative questions science cannot answer, which in turn implies that scientism cannot be sustained. His conception of harmless naturalism offers an appealing alternative, but its adequacy in turn depends upon distinctions in ontology that he does not address. The ultimate poverties of Humean empiricism and logical positivism are rooted in an inadequate appreciation of the nature of laws of nature. Although Almeder has not completed the enterprise, he provides important arguments that advance our understanding of the nature of knowledge and that contribute to the development of more adequate conceptions.

The very idea of naturalized epistemology rests upon misconceptions. We cannot even know who properly belongs to "the scientific community" without knowing which principles define its proper practice. As a purely descriptive inquiry, the study of the behavior of those who call themselves "scientists" takes in quacks, charlatans, and frauds. Only a normative inquiry, based upon justifiable views about the aim and the methods of science, can support appropriate distinctions between genuine and pseudo-science. A normative

inquiry of that kind would demonstrate how the methods of science thus defined can accomplish its goals.

So there is no possibility, in principle, of replacing traditional epistemology with naturalized epistemology. The whole enterprise is rooted in a category mistake. Somewhat more subtle but no less mistaken is the very idea that the empirical study of cognitive processes could be successfully pursued in the absence of the epistemic standards that cognitive systems must instantiate in order to qualify as rational. We cannot know which cognitive processes are rational without an adequate conception of rationality, which presupposes a philosophical defense. Traditional philosophy, like traditional epistemology, has nothing to fear from those who confound philosophy with psychology, or rationality with cognition.

Acknowledgment

It has been my pleasure to co-author with Robert Almeder a glossary, which those who want to pursue these issues may wish to consult (Fetzer & Almeder, 1993).

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Upright: The Evolutionary Key to Becoming Human by Craig Stanford. Houghton Mifflin, 2003. 224 pp. \$24.00 (hardcover). ISBN 0-618-30247-6.

Lowly Origins: When, Where and Why Our Ancestors First Stood Up by Jonathan Kingdon. Princeton University Press, 2003. 408 pp. \$35.00 (hardcover). ISBN 0-691-05086-4.

The relatively singular habit of posturing and parading poised on two feet has long been heralded as the hallmark of humanity. It seems to set apart even a human infant toddler to explore and manipulate its environment in ways that differ from all other organisms. Interest in the evolutionary history of this erect adaptation remains a central theme in the study of human origins and has